Digital Logic Lab

This lab aims to provide students with a lab experience of digital logic. This lab covers that following topics as listed in below table: logic gates, Boolean algebra, multiplexers, decoders and 7-segment display, adders and comparators, design of sequential circuits, synchronous counters, asynchronous counters, registers, ALU's.

Experiment no.	**Objective**
Exp1: Lab Introductory and Basic Logic Gates	**Determine** experimentally the truth tables for OR, AND, NAND, NOR, Inverter and XOR gates.
Exp2: Boolean Algebra, DeMorgan's Theorem & K-maps	**Verify** and Prove Boolean Laws. Verify DeMorgan's Theorem. Write sum-of-product (SOP) logic expressions for functions defined in given truth tables then implement these expressions by using the logic gates. Use K-map technique to simplify a logic expression in SOP format.
Exp3: Multiplexers And Decoders	**Check** the functions of the multiplexers (MUXs) and the decoders. use the multiplexer to implement a logic function Use the decoders to implement a logic function.
Exp4: Adders And Comparators	**Introduces** two important MSI circuits—the 4-bit adder and the 4-bit magnitude comparator.
Exp5: Design of Sequential Circuit	To **utilize** the basic flip-flops to build asynchronous counters.
Exp6: Synchronous Counters	To **utilize** the basic flip-flops to build synchronous counters. To utilize the 74LS161 Synchronous Binary Counter to get specific counting sequence. To utilize the 74LS193 UP/DOWN Binary Counter to get specific counting sequence.
Exp7: Registers	**Introducing** the different types of registers. Introducing some ICs registers
Exp8: ALU Implementation	To **take** an overview of the ALU as a concept. To understand the importance of ALU unit. To build a simple 1-bit ALU.
Exp9: Design and conduct an experiment	**Design** and **conduct** an experiment

Equipment and highlight

Model: M21-7100 Analog-digital training system

M21-7100 is High level, high quality digital-analog trainer, Replaceable 4 pin, connector, easy to maintenance, combines all essential function of analog and digital experiment, with removable breadboard, DC power supply, function generator, two pulse switches, 16-bit data switches, and 16 bit LED display.